

U.S. Department of the Interior  
National Park Service  
Environmental Assessment

**GEORGES ISLAND PUBLIC SAFETY IMPROVEMENTS**

Boston Harbor Islands National Park Area  
Massachusetts

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This document assesses the impacts related to the proposed Georges Island public safety improvements. If you wish to comment on this Environmental Assessment, you may submit comments until October 21, 2005 on the Internet at <http://parkplanning.nps.gov>.

Please note that names and addresses of people who comment become part of the public record. If you wish for us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

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**1. INTRODUCTION**

This Environmental Assessment describes and analyzes the proposed projects for the repair of unsafe historic bluestone walkways and the installation/replacement of safety fencing at Fort Warren on Georges Island, part of the Boston Harbor Islands national park area.

There are compelling reasons for these projects which will safeguard the public and protect historic resources. The National Environmental Policy Act (NEPA) requires the National Park Service (NPS) and other federal agencies to conduct a formal environmental review process on proposed projects prior to decisions on their implementation. This process is designed to disclose and analyze the purposes of and needs for a project, the potential alternatives to and impacts from the project, and provide for public involvement. The benefits of this process are greater public understanding of proposed projects combined with better implementation decisions. The process can help to identify less damaging alternatives and methods to avoid, reduce, or mitigate adverse impacts.

Under NEPA and related NPS policies, different proposed projects that are "closely related" or have "similar" geography, timing, or purposes should be captured together and receive combined environmental review. The projects summarized above fall within both categories. They are closely related and similar in terms of their location, timing, and purposes. Therefore, this environmental assessment is intended to provide NEPA review for both projects, and it enables

alternatives to be analyzed that combine or differentiate projects and purposes in a manner that would not be possible through separate reviews.

## **2. PURPOSE AND NEED FOR ACTION**

### **2.1 NEED FOR ACTION**

The partially restored Fort Warren, an impressive granite Third System fortification that has been designated as a National Historic Landmark (National Register Number 70000540), has stood on Georges Island as a major defensive post for the protection of the harbor in every conflict from the Civil War through World War II. The 41.3 acres of sculpted earthworks, granite walls, concrete gun batteries, parade ground, demilune, and sea walls, are an integral part of the defensive design.

The problem of public safety has been exacerbated by two of the major factors in the evolution of the island. Firstly, Georges Island, which was practically re-formed in its entirety as a fortification in the mid-nineteenth century, was intended for use as a structure of war in coastal defense, and over the years experienced dramatic physical changes to accompany the evolution of naval warfare and armaments. As a fortification, George's Island was therefore planned and constructed for a military population in time of war. Concerns for individual safety and comfort gave way to the greater objective of effective defensive capabilities. Secondly, since the end of World War II, the island and its fort, no longer used as a military installation, have suffered dramatic deterioration of their various structures and components. This has been particularly serious in the concrete portions of the Batteries Jack Adams and Bartlett and, to a lesser degree, in Battery Stevenson, and has aggravated an already dangerous condition of the original work to a visiting general public.

Today, the island, its fort and structures are the most popular island in the Boston Harbor Islands national park area, and visitors expect and should have a higher level of safety, comfort, and convenience than the island presently provides. The owners of the island, the Department of Conservation and Recreation, recognized this condition in the 1970's, when they installed safety fencing to some of the upper levels of the fort, as part of the development of the Boston Harbor Islands State Park. A further program of safety fencing in the early 1990's enabled more areas of the upper fort to be accessed safely by the general public. These actions have increased the accessibility of Fort Warren, but much work is still needed to improve the visitor experience.

There are a number of problems that must be addressed:

- The existing 19<sup>th</sup> century bluestone walkways, which run adjacent to two sides of the parade ground, are in generally poor condition. Not only is cracking and delamination common, but also many of the pavers have settled unevenly to form numerous tripping hazards. Missing pieces of bluestone have been infilled with a variety of materials, including concrete, sand and slate, creating a piecemeal effect.
- The granite curbs, which edge the bluestone walkways, are in good condition. However, due to the settling of the adjacent pavers, the curbs now form a tripping hazard. These will require to be reset as part of the walkway repairs.
- There are considerable areas of bituminous concrete pavement adjacent to the bluestone walkways. In some areas, particularly Bastions C and D, this pavement is either in very poor condition or has been removed completely, thereby exposing the

crushed stone sub-base. Besides acting as a tripping hazard, this has caused problems with the Fort's drainage system and must be addressed.

- The safety fencing installed in the 1970's to allow some of the upper areas of the fort to be safely opened to the public is now in very poor condition, after 30 years in a harsh marine environment, with some sections that are now unstable. The picket style fence that was installed has no basis in historical research. The fencing installed in the early 1990's was designed, following extensive research, to be more historically appropriate, with two designs of fencing corresponding to the two major development periods of the fort. Any new fencing should follow these later designs.
- Some of the previously installed safety fencing in exposed areas has experienced severe erosion of the grouting, causing instability in some areas. Measures are required to address this situation to prevent the loss of existing fencing.

## 2.2 OBJECTIVES OF THE ACTION

- To improve the condition of the existing bluestone walkways and remove the tripping hazard that currently exists.
- To remove the existing historically inaccurate and unstable safety fencing that was installed in the 1970s and replace with a more appropriate design of fencing.
- To replace the damaged and unsafe fencing to the open stairwells on Fronts II and III, and Bastion C.
- To prevent public access to those areas of Fort Warren that are considered unsafe at present.

## 2.3 OBJECTIVES DESCRIBED IN MISSION STATEMENT AND DRAFT GENERAL MANAGEMENT PLAN

The above objectives are consistent with the aims stated in the Boston Harbor Islands national park area Mission Statement:

*“The mission of the Boston Harbor Islands, a national park area, is to make the island system an integral part of the life of the surrounding communities and region, and to protect the islands as a resource of national significance, while improving public knowledge and access for education, recreation, and restful solitude within an urban area.”*

The Boston Harbor Islands General Management Plan contains a number of policies directly applicable to these projects. These are:

“...protects cultural resources against theft, fire, vandalism, environmental impacts, and other threats, without compromising the integrity of the resources... The preservation of cultural resources in their existing states always receives first consideration.”

“The management of cultural landscapes recognizes and protects significant historic, archeological, ethnographic, and design values.”

“Because unused structures are susceptible to neglect and vandalism accelerating their deterioration, compatible uses for historic structures are found where appropriate. All uses of historic structures are subject to preservation and public safety requirements. No administrative or public use is permitted that would threaten the stability or character of a structure.”

“...to provide reasonable access to the park and to ensure that the means of circulation within and on the surrounding lands and waters foster convenient enjoyment of park resources.”

## 2.4 CONTEXT

Located in the middle reaches of Boston Harbor, Georges Island commands the outer harbor, with Fort Warren dominating the 40-acre island. The appearance of the Fort dates from the mid 19th to the early 20th century. The major island access is from a wooden pier onto a granite wharf, in front of which sits the brick Mine Storage / Administration building. From the pier, Fort Warren is accessed either up the outer "glacis" slope towards the Fort's grass crowned granite walls, or through the early 20th century concrete mine casemate tunnel to the Fort's outer sallyport ditch.

Georges Island was farmed in colonial times and first fortified by the French during the Revolution. Transformed from a double knolled drumlin island into a militarily sculptured landscape, the island's present configuration is almost completely man-made. The western shore consists of a length of gravel beach split by the Fort's granite faced wharf, while the remaining shoreline is bound by a series of concrete or granite seawalls and rip-rap slopes, in various states of repair. The island's westerly side at the pier starts as a flat plain which then rises up a "glacis" slope towards the granite walls of the Fort. A similar northern plain is flanked by the Fort's earth mounded coverface which helps define the alley-like ditch, which partially surrounds four sides of the fort. A truncated "ravelin" earthwork helps mask the Fort's southern side. The main fort's outer granite scarp walls are generally thirty feet high and capped with a steep 15-foot high grassy parapet. The fort's interior parade ground is flat while the parade walls vary from 20-foot high masonry walls to similar height grassy slopes.

The present granite Fort Warren was built between 1833-1860 as Boston's primary seacoast defense and is best known for its service as a prison for Confederate soldiers during the Civil War. The fortifications were upgraded in the early 1870s and again in the 1890s-1900s, with the post under military control through World War II. The Metropolitan District Commission, now the Department of Conservation and Recreation, purchased Georges Island from the Federal Government in 1958. The Fort was listed as a National Historic Landmark on the National Register of Historic Places in 1970 – National Register Number 70000540.

Fort Warren is a 19<sup>th</sup>-century granite walled, five bastioned pentagonal fortification flanked at various locations by an earthen coverface, an earthen ravelin and a glacis slope, which help to define the work's defensive ditch. The Fort's parade ground is defined on three curtains by 20-foot high Greek Revival style granite walls, two of which are pierced by a major and a minor rusticated sallyport portals. Grassy slopes leading up to the former gun bearing terreplein define the other two sides. The finished casemates within the masonry fronts, (some in excellent condition, some water damaged), are variously trimmed with either Greek Revival or Gothic Revival finish, while the exposed masonry vaults of the gun galleries are especially impressive. A gable roofed, slate-capped granite 1860s powder magazine stands on the parade's western flank. On top of the fort walls on Bastion C is a small brick, 2-story, flat roofed fire control tower providing all-round vistas of the harbor, while a single story concrete "pill box" on Bastion B provides views down harbor. Straddling Front I are the concrete disappearing gun emplacements of Battery Stevenson, while earlier cannon platforms line the rest of the Fort's ramparts and coverface.

Elsewhere on the island, the 2-story Mine Storage/administration building dominates the pier area. To the north, the wood framed Mine Casemate Building is encased in a concrete pillared, open-faced bunker whose adjacent concrete entrance tunnel accesses the Fort's ditch, and is itself flanked by the granite-veneered guardhouse buried in the westerly end of the coverface. The granite casemated demilune on the northerly flank of the coverface contains an impressive spiral staircase. On the southerly ravelin's seaward face stands the three surviving, grass parapeted, massive concrete disappearing gun

emplacements of Battery Bartlett, which is faced on the rear by a long concrete columned portico. On the island's west flank stands the low, earthen parapeted, concrete gun platforms for the diminutive Battery Lowell. No original weapons survive on site.

Georges Island became part of the National Park System in 1996, when the Boston Harbor Islands national park area was formed. The unique feature of this particular park is that the NPS does not own any of the land, but is actually part of a management entity known as the Boston Harbor Islands Partnership. The purpose of this entity is "to coordinate the activities of the Federal, State, and local authorities and the private sector in the development and implementation of a general management plan. The enabling legislation (Public Law 104-333) established that the Partnership would consist of 13 members: National Park Service, U.S. Coast Guard, Massachusetts Department of Conservation and Recreation (2 seats), Massachusetts Water Resources Authority, Massachusetts Port Authority, City of Boston, Boston Redevelopment Authority, Thompson Island Outward Bound Education Center, The Trustees of Reservations, Island Alliance, and Boston Harbor Islands Advisory Council (2 seats).

Fort Warren and Georges Island are owned and operated for the Commonwealth of Massachusetts by the Department of Conservation and Recreation.



Figure 1 – Regional Map



Figure 2 – Local Map



Figure 3 – Front II 1970s picket fence with more historically appropriate fence on Front III in background.



Figure 4 – 1970s “temporary” safety fencing at Mine Casemate and tunnel.



Figure 5 – Double pipe fencing on Front I’s Battery Stevenson using original 1890’s type fencing.



Figure 6 – Badly cracked bluestone pavers in Bastion D



Figure 7 – Bluestone pavers and granite curbs badly misaligned in Bastion C.



Figure 8 – Previously repaired walkway along Front II.

### 3. ALTERNATIVES

- 3.1 **The “no action” alternative** – this assumes that no repair or replacement work will take place. All bluestone walkways and fencing will be left as is. There will be no development of the site – refer to figure 9.
- 3.2 **The “preferred” alternative** – as much as possible of the existing bluestone walkways will be removed and reset; where the stones are damaged beyond a salvageable standard, they will be replaced with new bluestone pavers to match. All misaligned granite curbs will be reset to the new paving levels. The adjacent bituminous concrete paving will be repaired where it has been necessary to remove it for construction purposes or where it has eroded. The existing historically inappropriate safety fencing will be replaced with new fencing designed to match the fencing installed in the early 1990’s. The existing fencing at the stairwells on Front III and Bastions C and D will be upgraded to increase public safety – refer to figures 10,11,12.
- 3.3 **The “stonedust” alternative** – this assumes that the bluestone pavements will be removed to avoid the tripping hazard, and replaced with stonedust, compacted to create a generally firm, stable and accessible surface. The granite curbs and bituminous concrete paving will be rehabilitated as needed as in the “preferred” alternative. All existing safety fencing is retained, with repairs as necessary. New historically appropriate fencing will be added to allow additional areas of the fort to be opened to the public.
- 3.4 **The “concrete” alternative** – in this alternative, the bluestone pavements will be replaced with a concrete pavement to remove the tripping hazard. The Park will retain all salvageable bluestone for use either on Georges Island or elsewhere at the DCR’s Fort Independence on Castle Island. All misaligned granite curbs will be reset to the new paving levels. The adjacent bituminous concrete paving will be repaired where it has been necessary to remove it for construction purposes. The existing historically inappropriate safety fencing will be replaced with a more suitable design to give a uniform appearance.

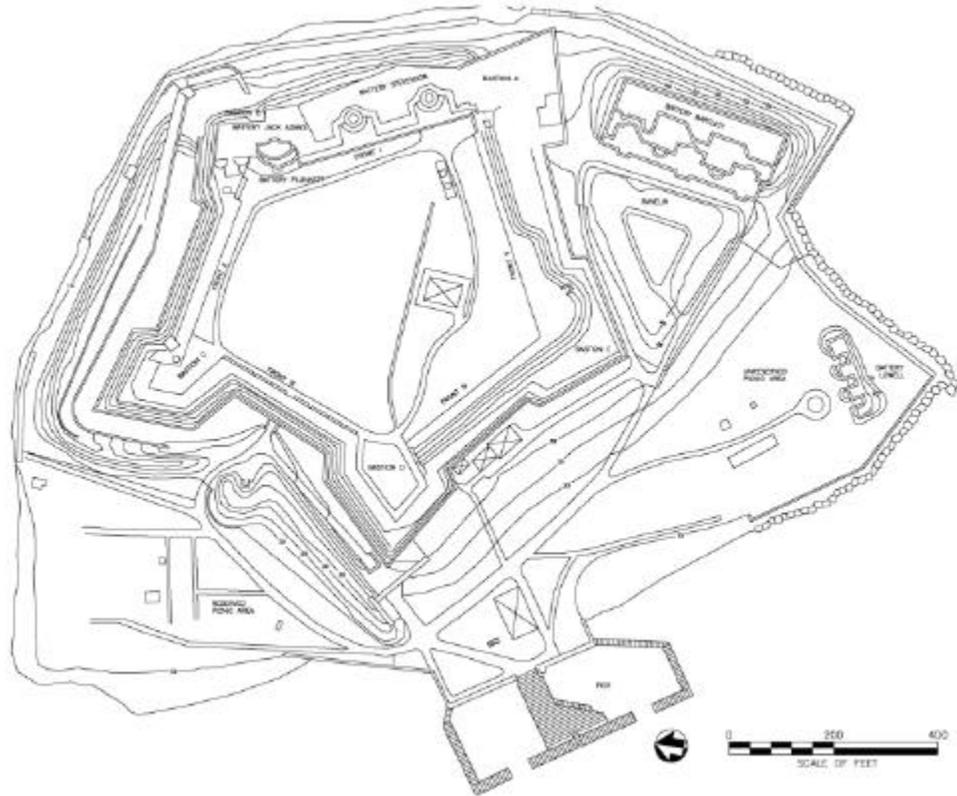


Figure 9 – Fort Warren, George's Island

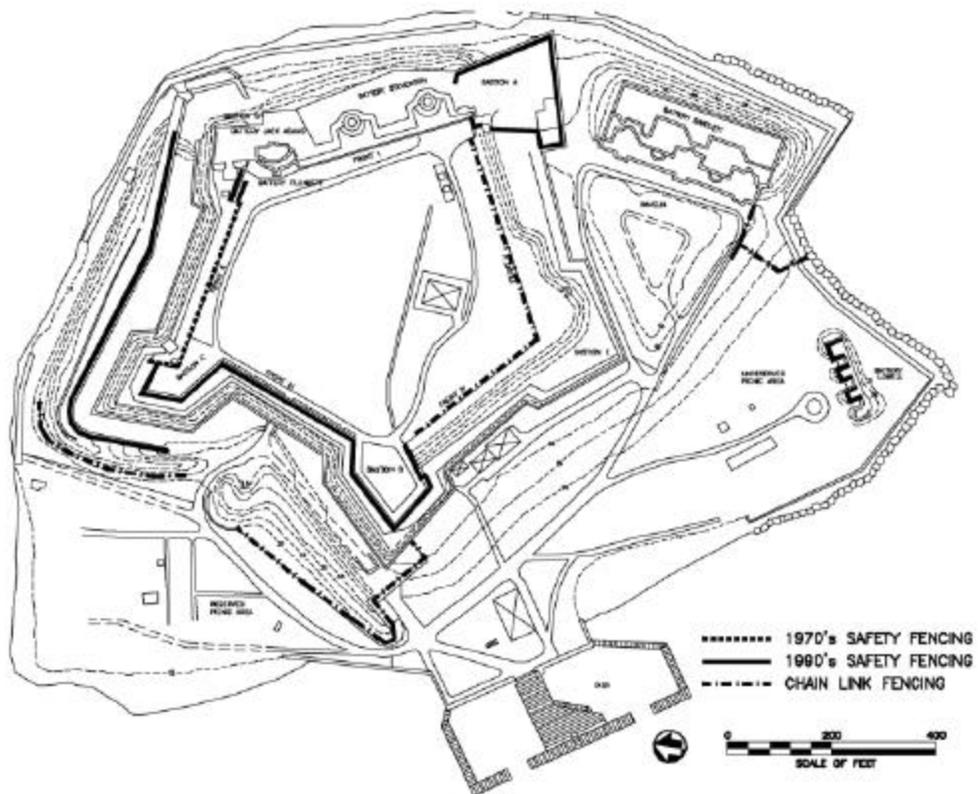


Figure 10 – Existing Safety Fencing

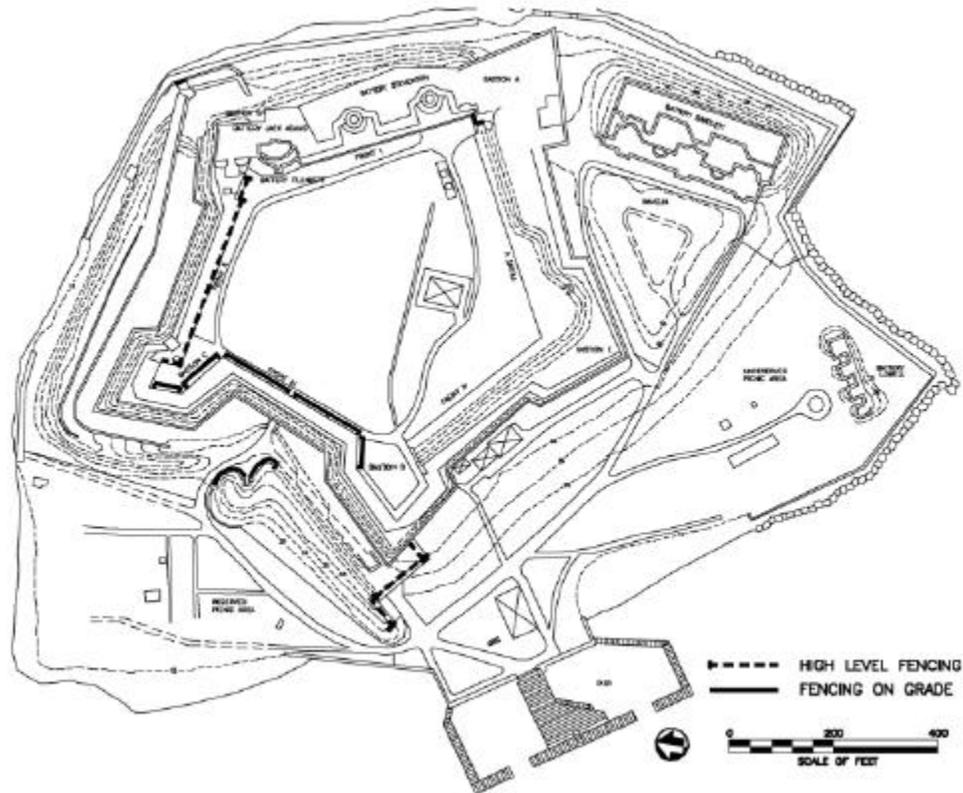


Figure 11 – Proposed Safety Fencing

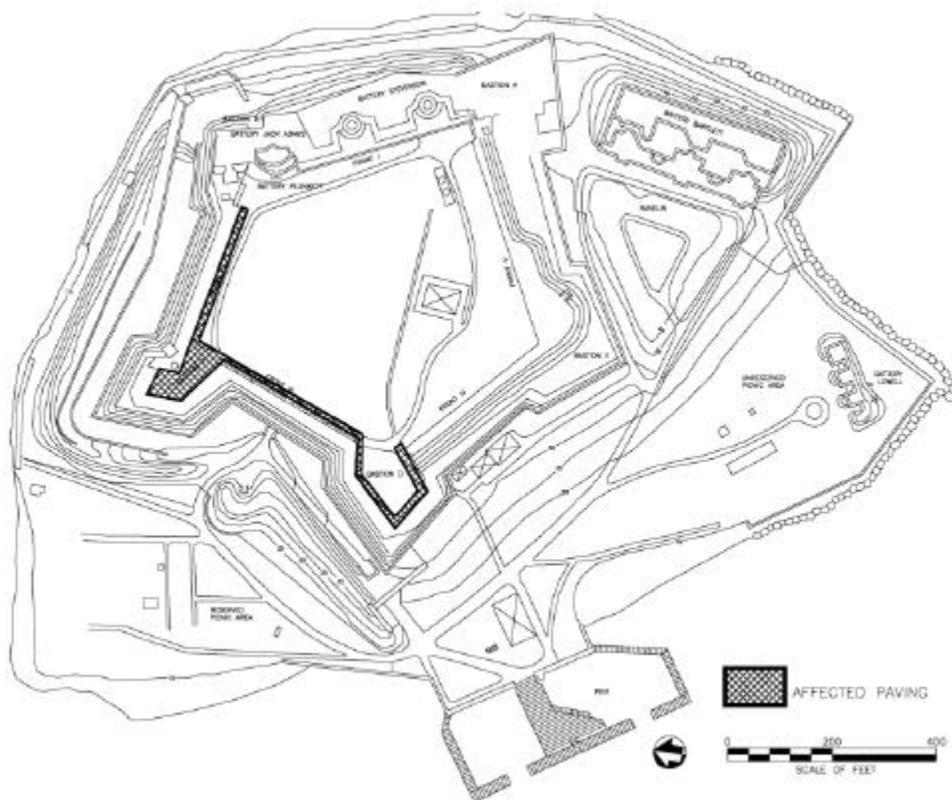


Figure 12 – Affected Walkways

## 4 AFFECTED ENVIRONMENTS

Fort Warren on Georges Island is a former military environment. Despite being located on an island, the landscape is virtually entirely man-made, although since the fort ceased being used by the military and maintenance was reduced, nature has begun to re-assert itself. The proposed projects would be confined to the interior of Fort Warren and would not affect natural environmental categories, such as geological resources, wildlife or fish habitats, floodplains or wetlands, etc. Fort Warren is listed on the National Register of Historic Places as a National Historic Landmark, and is the primary resource on the island. Any proposed improvements must therefore be carefully assessed for its impact on the historical and cultural environments.

The major categories of affected environments are:

- 4.1 **Recreation Resources** – any effects on both the provision of recreational activities on site and access to recreational facilities. The affected environment in this case is the area of Fort Warren, which is accessible to the general public.
- 4.2 **Visitor Experience** – the effects of the alternatives on the aesthetic experience of the visitors using or passing through the site. These effects are not limited to those parts of the alternatives that are accessible to members of the general public, but should also include any areas that are visible during their experience.
- 4.3 **Cultural Resources** – the effects of any of the alternatives on the cultural resources of Georges Island, including historic buildings and structures, cultural landscapes, and archeological and ethnographic sites.
- 4.4 **Educational Resources** – the effects on educational resources available within the site as a result of carrying out the proposed alternatives. This affected environment is limited to those parts of the site that are accessible to members of the general public.
- 4.5 **Long-term Management of Resources** – the effects of the alternatives on the ability of the DCR to effectively manage the available resources on a long-term basis.
- 4.6 **Universal Accessibility** – the effects of the alternatives on the accessibility of handicapped persons using or passing through the site. These effects are limited to those parts of the site that are accessible to the general public, and the areas occupied by those members of staff whose duties can be carried out by persons with disabilities.
- 4.7 **Public Health and Safety** – the effects of the development alternatives on any health or safety issues affecting the general public. The relevant areas are limited to the development site.

## **5 ENVIRONMENTAL IMPACTS**

### **5.1 RECREATION RESOURCES**

#### **5.1.1 Alternative 1- “no action”**

The parade ground and ramparts of Fort Warren provide a unique recreational resource in the Boston area. These include extensive open areas within a historical setting, with the walkways on the ramparts providing spectacular views of the Boston skyline and Boston Harbor. If no action is taken, the condition of these resources will continue to deteriorate, with the uneven walkways continuing to pose a tripping hazard to the public.

#### **5.1.2 Alternative 2 – “preferred”**

The impact of this alternative would be to greatly improve the access to and around the recreational resources in Fort Warren. The tripping hazard that the bluestone walkways currently pose would be removed. The corroded fencing within the fort will be replaced, thereby increasing the safety of the public on both the upper areas of the fort and adjacent to the stairwells. There would be no impact on the recreational resources themselves, other than some temporary loss of use during the construction phase.

#### **5.1.3 Alternative 3 – “stonedust”**

The impact of this alternative would be similar to the “preferred” alternative above. The extent of the impact however, would be slightly different. There would be no change in the walkways, as the stonedust will provide similar access capabilities to the bluestone. However, with the addition of more fencing, the extent of accessible areas will be increased. As in the “preferred” alternative above, there would be a temporary loss of the recreational resource during construction.

#### **5.1.4 Alternative 4 – “concrete”**

The impact of this alternative would again be similar to the “preferred” alternative above.

### **5.2 VISITOR EXPERIENCE**

#### **5.2.1 Alternative 1 – “no action”**

If the current situation is not addressed, the experience of the visitor using Fort Warren will not be improved. The existing bluestone walkways are in a poor condition, which contributes to the air of dilapidation around the fort. This is an inevitable outcome of the lack of financial resources available to provide upkeep. The fencing systems have accumulated over a number of years and in many cases have no historical relevance. Repairs have been carried out in the cheapest manner possible. This results in a visitor experience that is visually haphazard. If no action is taken then this will continue to be the case.

#### **5.2.2 Alternative 2 – “preferred”**

Under this alternative the visitor experience would be greatly improved. The refurbished bluestone walkways would provide a walking surface very similar to that experienced by the soldiers stationed at the fort in the past. The installation of historically appropriate fencing would provide a more consistent appearance around the top of the facades, and would remove a great deal of the unsightly and

inappropriate fencing both inside and outside the fort. There would be a temporary adverse effect on the visitor experience during the construction phase.

- 5.2.3 **Alternative 3 – “stonedust”**  
The impact of this alternative would have some similarities to the “preferred” alternative, but would give a different experience to the visitor. The replacement of the bluestone by stonedust will change the appearance of the parade ground, by altering both the color and texture of the walkways. By retaining the existing fencing, the current inconsistent appearance of the facades would be maintained though this could be mitigated through interpretation of the improvements.
- 5.2.4 **Alternative 4 – “concrete”**  
The impact of this alternative would be similar to the “stonedust” alternative above, in that it would completely alter the color and texture of the walkways. By replacing the historically inaccurate fencing, the consistency of the facades would be improved. Construction would cause some temporary adverse effects on the visitor experience.

### **5.3 CULTURAL RESOURCES**

- 5.3.1 **Alternative 1 – “no action”**  
The main cultural resource on Georges Island is Fort Warren, which includes not only the buildings of the fort itself, but also the associated military landscape design. By taking no action, the condition of these cultural resources would continue to deteriorate under the effects of environmental erosion and wear through use by the general public.
- 5.3.2 **Alternative 2 – “preferred”**  
The impact of this alternative would be to help protect the cultural resources. The repair of the walkways and associated curbs and pavements will extend the practical lifespan of these resources, although there will be some loss of historic fabric through the removal of damaged stones. The replacement of historically inaccurate fencing by more appropriate designs would improve the integrity of the Fort Warren.
- 5.3.3 **Alternative 3 – “stonedust”**  
The impact of this alternative would be similar to those of the “preferred” alternative above, although the retention of the existing railings would be a minor drawback in comparison with the “preferred” alternative. The replacement of the bluestone pavers by stonedust would also alter the appearance of the parade ground and result in the loss of important historic fabric.
- 5.3.4 **Alternative 4 – “concrete”**  
The impact of this alternative would also be similar to the “preferred” alternative above, although the replacement of the bluestone pavers would cause a change in the appearance of the fort interior spaces and result in the loss of an important historical resource.

### **5.4 EDUCATIONAL RESOURCES**

- 5.4.1 **Alternative 1 – “no action”**  
There are numerous educational resources available to the public on Georges Island. There is a limited interpretive sign program throughout the fort, and guided tours are

routinely available during the summer season for both school groups and the general public. If no action were taken, these resources would remain unaffected.

#### 5.4.2 Alternative 2 – “preferred”

The impact of this alternative would be felt in the improvement of accessibility for guided tours around the fort. There would be no material impact on the educational resources themselves.

#### 5.4.3 Alternative 3 – “stonedust”

The impact of this alternative would be similar to the “preferred” alternative above, although the loss of the historic bluestone pavers would mean a reduction in the educational opportunities related to the historic fabric of the fort.

#### 5.4.4 Alternative 4 – “concrete”

The impact of this particular alternative would again be similar to the “stonedust” alternative described above.

### 5.5 LONG TERM MANAGEMENT OF RESOURCES

#### 5.5.1 Alternative 1 – “no action”

By taking no action, park management would risk the further loss of resources. The bluestone walkway surfaces are uneven and would almost inevitably suffer further damage from both erosion and foot traffic. The fencing at both rampart and parade ground level would continue to deteriorate, causing further maintenance and safety problems. Resources have been poorly managed for many years due to the lack of funding. Taking no action would only exacerbate this problem.

#### 5.5.2 Alternative 2 – “preferred”

Adopting this alternative would enable the park to better manage its resources on a long-term basis. The repairs to the bluestone walkways would allow them to be maintained with a minimal budget. The original bluestone pavers have been in place for more than 100 years and many are still in excellent condition. Rehabilitating the walkways should extend their life considerably. The safety fencing would be replaced where necessary to provide a more historically appropriate appearance and to increase public safety. These fences would require to be replaced at some point, as Fort Warren is a particularly severe marine environment for metalwork.

#### 5.5.3 Alternative 3 – “stonedust”

The impact of this alternative would be similar to the “preferred” alternative above although the stonedust would require more maintenance than the bluestone to avoid becoming a tripping hazard. It would require periodic replacement due to water erosion and displacement by the public.

#### 5.5.4 Alternative 4 – “concrete”

The impact of this alternative would again be similar to the “preferred” alternative above, but would be easier to maintain, and would not require the periodic replacement of the stonedust alternative above.

### 5.6 UNIVERSAL ACCESSIBILITY

#### 5.6.1 Alternative 1 – “no action”

People with disabilities require assistance to land on Georges Island, as the gangways at the dock are normally too steep to negotiate without help. At present the

only areas of Fort Warren that are accessible to wheelchair users are those areas outside the walls and the parade ground. Even these areas require assistance to negotiate some of the obstacles. Both access points into the fort, the sally port and through Bastion D, are inaccessible to unaccompanied wheelchair users. The present state of the bluestone walkways makes wheelchair use within the walls of the fort hazardous. Taking no action will only cause this situation to deteriorate. The upper levels of the fort are inaccessible to the handicapped.

5.6.2 Alternative 2 – “preferred”

The impact of this alternative would be to improve the accessibility of the walkways within the fort. Removing the tripping hazard would allow easier access within the fort, although wheelchair users will still require assistance to gain access to the fort interior and parade ground. There would be no increase in the extent of accessible areas.

5.6.3 Alternative 3 – “stonedust”

The impact of this alternative would be similar to the “preferred” alternative above.

5.6.4 Alternative 4 – “concrete”

The impact of this alternative would also be similar to the “preferred” alternative, and would provide the smoothest surface of any of the alternatives.

## 5.7 PUBLIC HEALTH AND SAFETY

5.7.1 Alternative 1 – “no action”

The existing situation is cause for concern. The reason behind this document is to evaluate various options to improve public safety. Taking no action would merely tend to increase the possible hazards to public health and safety, which include; uneven and hazardous bluestone paving and curbs, unstable and severely corroded parapet fencing, unsafe and corroded fencing to the parade ground stairwells.

5.7.2 Alternative 2 – “preferred”

The impact of this alternative would be to improve the safety of the public. Resetting the bluestone walkways would remove the current tripping hazards. Replacement of corroded fencing would increase the safety of the public at the upper levels of the fort, and the removal of the existing picket fence over Front II would replace the dangerous spiked top with a safer flat bar design.

5.7.3 Alternative 3 – “stonedust”

The impact of this alternative would be similar to the “preferred” alternative above, although the picket fence will remain and be repaired as necessary.

5.7.4 Alternative 4 – “concrete”

The impact of this alternative would again be similar to the “preferred” alternative above.

## 6. UNAFFECTED ENVIRONMENTAL CATEGORIES

The following environmental categories are unaffected by any of the proposed action alternatives and have therefore been disregarded as ineligible for consideration under this environmental assessment:

1. Geological resources – soils, bedrock, streambeds, etc.
2. Air quality, traffic, or noise – any of the action alternatives will cause adverse effects on the levels of noise and air pollution during construction over the “no action” alternative.
3. Water quality or quantity
4. Streamflow characteristics
5. Marine or estuarine resources
6. Floodplains or wetlands
7. Land use, including occupancy, income, values, ownership, type of use
8. Rare or unusual vegetation – old growth timber, riparian, alpine, etc.
9. Species of special concern (plant or animal; state or federal listed or proposed for listing) or their habitat
10. Unique ecosystems, biosphere reserves, World Heritage sites
11. Unique or important wildlife or wildlife habitat
12. Unique or important fish or fish habitat
13. Introduce or promote non-native species (plant or animal)
14. Socioeconomics, including employment, occupation, income changes, tax base, infrastructure, etc.
15. Minority and low-income populations, ethnography, size, migration patterns, etc.
16. Energy resources
17. Other agency or tribal land use plans or policies
18. Resource, including energy, conservation potential

## **7. ENVIRONMENTALLY PREFERRED ALTERNATIVE**

Under NPS policy, the environmentally preferred alternative is defined as the alternative analyzed that would be the most beneficial for the environment, or that which would have the least adverse impacts. Of the four alternatives analyzed in this assessment, Alternative 2, the “preferred” alternative, is also the environmentally preferred alternative.

This is because changing the walkway material would cause a significant change to the appearance of the parade ground, and would involve the loss of the valuable bluestone pavers. Any change in the appearance of this historically significant structure has to be carefully considered. Refurbishing the bluestone and replacing with new stone only where necessary is the most environmentally friendly approach, because it retains a majority of existing materials, and doesn’t require disposal and manufacturing. Installing stonedust would be a particularly intrusive decision due to the additional maintenance problems this would cause.

## **8. CUMULATIVE IMPACTS**

Under NEPA and NPS and DCR policy, any potential cumulative impacts should be assessed. These are defined as “additive” impacts to a particular resource and include impacts of actions in the past, the present, and the reasonable foreseeable future.

All of the action alternatives would improve the present situation and lead to a safer and more enjoyable visitor experience. The removal of historically inappropriate fencing is an improvement to the integrity of the resource that is Fort Warren. The only foreseeable action that would reasonably follow any of the action alternatives would be similar improvements to additional fences and walkways. If this were to be proposed, funded and carried out, the cumulative input would be beneficial. None of the action alternatives would result in impairment of resources.

## **9. NON-IMPAIRMENT**

Under the NPS Organic Act of 1916, current Policies and Director's Orders, Boston Harbor Islands national park area and other units of the National Park System are to be managed to preserve their scenic, natural and cultural resource values by such means as will leave them unimpaired for the enjoyment of future generations. This establishes a "non-impairment" standard that prohibits officials from allowing any project or use that would impair park resources and values, as deemed significant in the park's legislative enactment, focused on in the park's mission statement and addressed in the park's General Management Plan. The determination of impairment rests with the professional judgment of the given park's managers, consistent with the park's legislation, purpose and mission, NPS Policies and Orders, as well as the park's management plan, and in the case of Georges Island, with the policy of the DCR as property owners.

None of the action alternatives considered in this environmental assessment would cause impairment to park resource values. The alternatives are consistent with relevant federal and state laws and the park's current General Management Plan. Such improved facilities would enhance the visitor's experience by the increased safety of the resource, as well as underlining the preservation mission and to leave the resource values unimpaired for future generations.

## **10. ENVIRONMENTAL JUSTICE**

Under NPS policies, the environmental review of proposed projects should include consideration of "environmental justice" issues. This means that no group of people, including racial ethnic or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from the execution of federal, state, local, and tribal environmental programs and policies.

In terms of this review, the action alternatives are consistent with the Boston Harbor Islands national park area General Management Plan. There would be no disproportionate adverse impacts on any group of people, including racial, ethnic, or socioeconomic groups.

## **11. SUSTAINABLE "GREEN" BUILDING DESIGN, MATERIALS, AND CONSTRUCTION**

While the National Park Service endeavors to encompass sustainable design in all of its projects, it is not always possible to apply these principles. This project is one of those that do not lend itself easily to sustainable design. The emphasis on the historical context requires that any new materials be similar to those already in place. The bluestone paving will be re-used where possible and extreme care will be taken to avoid damage to the existing fabric of the fort. During construction activities, the best management practices will be adopted to avoid adverse effects on both the fort and the other resources of the Park.

## 12. MASSACHUSETTS COASTAL ZONE MANAGEMENT PLAN

Massachusetts has an approved Coastal Zone Management Program (CZMP). Initial discussions with the Office of Coastal Zone Management, which administers the CZMP, indicated that there are four applicable Coastal Management Program Policies. The following summary analysis of the consistency of the proposals with the CZMP is based on the information contained in this Environmental Assessment and the applicable CZMP policies.

### Protected Areas

**Policy 3 – Ensure that proposed developments in or near designated or registered historic districts or sites respect the preservation intent of the designation and that potential adverse effects are minimized.**

The preferred alternative involves repair and renovation activities on a structure designated as a National Historic Landmark. The walkway repairs are intended to restore the paving to a similar condition to the original installation. The fencing replacement will remove existing fences that have no historical basis, and replace them with fences that are of a similar design to those installed at forts of the same historical period. This will respect the preservation intent of the designation.

### Coastal Hazards

**Policy 3 – Ensure that state and federally funded public works projects proposed for location within the coastal zone will:**

- **Not exacerbate existing hazards or damage natural buffers or other natural resources.**
- **Be reasonably safe from flood and erosion related damage.**
- **Not promote growth and development in hazard-prone or buffer areas, especially in Velocity zones and ACECs.**
- **Not be used on Coastal Barrier Resource Units for new or substantial reconstruction of structures in a manner inconsistent with the Coastal Barrier / Improvements Acts.**

The preferred alternative does not involve spending public investment in hazardous coastal areas. The majority of development takes place within the walls of Fort Warren in a reasonably sheltered environment. Those operations outside the walls are in locations well away from the coastline. The proposed activity would therefore, be consistent with this policy.

### Public Access

**Management Principle 1 – Improve public access to coastal recreation facilities and alleviate auto traffic and parking problems through improvements in public transportation. Link existing coastal recreation sites to each other or to nearby coastal inland facilities via trails for bicyclists, hikers, and equestrians, and via rivers for boaters.**

The proposed development will improve the access of the general public to the recreational facility that is Fort Warren. Repair of the walkways will reduce the tripping hazard, and the fencing operations will enable the public to access the upper levels of the fort in greater safety. Therefore, the proposed activity would be consistent with, and would advance, this policy.

### Public Access

**Management Principle 2 – Increase capacity of existing recreation areas by facilitating multiple use and by improving management, maintenance and public support facilities. Resolve conflicting uses, whenever possible, through improved management rather than through exclusion of uses.**

The proposed development will increase the ability of Fort Warren to safely accommodate the public by reducing the potential hazards.

### **Conclusion**

Given the information contained elsewhere in this Environmental Assessment and the preceding summary analysis, the proposed activity would be consistent to the maximum extent practicable with, and would advance the applicable policies of, the Massachusetts Coastal Zone Management Plan.

### **13. COMPLIANCE AND CONSULTATION**

The conceptualization and development of the proposed project occurred over several years and involved many NPS and DCR staff, other state and federal officials, the Island Alliance, and consultants. During this time, the Massachusetts Historical Commission approved an archaeological survey of the project area and accepted the final report. Discussions were also held with the Boston Conservation Commission and the Massachusetts Office of Public Safety.

In addition to the National Environmental Policy Act, there are other federal, state, and local laws and permit requirements that must be fulfilled before any of the action alternatives may be implemented. For instance, this environmental assessment will be used as a tool for consultation with the Massachusetts State Historic Preservation Officer, in compliance with the National Historic Preservation Act, as amended.

Notice of the availability of this environmental assessment is being sent to relevant federal, state and local officials, and a comprehensive list of people who have expressed a strong interest in issues affecting Boston Harbor Islands national park area, including members of the Boston Harbor Islands Advisory Council. The full environmental assessment is available on the Internet at <http://parkplanning.nps.gov>. A printed copy is available for review at:

Boston Harbor Islands Partnership Office  
408 Atlantic Avenue, Suite 208  
Boston, Massachusetts 02110

Comments may be submitted on the Internet at <http://parkplanning.nps.gov>. All comments received on this assessment will be carefully reviewed. Following review, the National Park Service Northeast Regional Director has two choices: to approve a Finding of No Significant Impact (FONSI) and complete the NEPA compliance process, or to find that one or more significant impacts may occur and therefore an Environmental Impact Statement (EIS) must be prepared and distributed for public comment.

### **14 PREPARERS**

The preparers of this document were:

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## 15. GLOSSARY OF TERMS

**From:** Robinson, Willard B., American Forts, Architectural Form and Function, 1977  
Swann, Donald, Georges Island Interpreters Handbook (partially taken from Stokinger, 1976).

|                          |   |
|--------------------------|---|
| <b>Banquette</b>         | A continuous step or ledge at the base of a <b>parapet</b> on which defenders stood to fire over the top of the wall.   |
| <b>Bastion</b>           | A projection on the <b>enceinte</b> , made up of two faces and two flanks, which enabled the garrison to defend the ground adjacent to the <b>enceinte</b> .  |
| <b>Battery</b>           | A line work containing weapons separate from the main fort.   |
| <b>Body of the Place</b> | The main enclosing <b>fortifications</b> from which the major defensive activities occurred.  |
| <b>Casemate</b>          | A bombproof enclosure, generally located within the <b>rampart</b> , for housing cannons, which fired through <b>embrasures</b> in the <b>scarp</b> . <b>Casemates</b> were also used as quarters, <b>magazines</b> , and the like. In permanent <b>fortifications</b> they were vaulted, but in impermanent works they sometimes had trabeated structures. During the nineteenth century, rows of <b>casemates</b> often were built in tiers in seacoast defenses. |
| <b>Castle</b>            | In the medieval period, a fortified building or group of buildings. In nineteenth-century America the term also denoted a type of seacoast <b>fortification</b> resembling the form of a medieval shell-keep.   |
| <b>Counterscarp</b>      | The exterior side of the <b>ditch</b> – the side away from the <b>body of the place</b> .   |
| <b>Covered Way</b>       | A road around a <b>fortification</b> between the <b>ditch</b> and the <b>glacis</b> . It was protected from enemy fire by a <b>parapet</b> , at the foot of which was generally a <b>banquette</b> enabling the coverage of the <b>glacis</b> with musketry. In addition to its function as an outer line of defense, it served as a place for sorties to assemble.   |
| <b>Coverface</b>         | A work made up of two faces forming a <b>salient</b> angle and placed before <b>bastions</b> or <b>ravelins</b> , but separated from them, to protect their faces from cannon fire.   |
| <b>Curtain</b>           | A section of a bastioned <b>fortification</b> that lies between two <b>bastions</b> .   |
| <b>Demilune</b>          | Detached work, normally in crescent shape, intended to mask a front or fronts.  |
| <b>Ditch</b>             | A wide, deep trench around a defensive work, the material from the excavation of which was used to form the <b>ramparts</b> . When filled with water, it was termed a moat or wet ditch; otherwise it was called a dry ditch.   |
| <b>Embrasure</b>         | An opening in a wall or <b>parapet</b> through which cannons were fired. The sides, generally splayed outwards, were termed cheeks; the bottom was called the sole; the narrow part of the opening, the throat; and the widening, the splay.  |
| <b>Emplacement</b>       | A location or mount for a fixed cannon.   |
| <b>Enceinte</b>          | The works of fortification – walls, <b>ramparts</b> , and <b>parapets</b> – that enclose a <b>castle</b> , <b>fort</b> , or fortress.   |

|                                 |   |
|---------------------------------|---|
| <b>Exterior Slope</b>           | A steep earth incline on the exterior side of a <b>rampart</b> , which connects the <b>superior slope</b> with the ground, <b>scarp</b> , or berm.  |
| <b>Face of the Bastion</b>      | The section of any <b>bastion</b> between the flanked angle and the shoulder angle. In a regular <b>bastion</b> it was one of the two sides of the <b>bastion</b> , which formed a <b>salient</b> angle pointing outwards, and which was situated on the lines of defense.  |
| <b>Flank of the Bastion</b>     | The section of the <b>bastion</b> lying between the <b>face</b> and the <b>curtain</b> , from which the <b>ditch</b> in front of the adjacent <b>curtain</b> and the <b>flank</b> and <b>face</b> of the opposite <b>bastion</b> were defended.   |
| <b>Flank Wall</b>               | In some five-sided works, a term designating the section of the <b>enceinte</b> between a <b>face</b> and the <b>gorge</b> .  |
| <b>Fort</b>                     | A work established for the defense of a land or maritime frontier, of an approach to a town, or of a pass or river. Although the term originally denoted a small <b>fortification</b> garrisoned by troops, in North America it was used to designate virtually any establishment – civil or military – associated with protection from adversaries, regardless of whether any actual fortifications were included. |
| <b>Fortification</b>            | The art of building works for defense or attack, which, through their form and construction, enabled their occupants to resist assaults by superior forces for a considerable length of time.   |
| <b>Front of a Fortification</b> | The works – <b>flanks</b> , <b>faces</b> , <b>curtains</b> , and so on – associated with a single side of the polygon of <b>fortification</b> . Thus, one front of a bastioned <b>fort</b> consisted of two half <b>bastions</b> , a <b>curtain</b> , and related outworks.   |
| <b>Gate</b>                     | A main entrance in the <b>enceinte</b> of a <b>castle</b> , <b>fort</b> , or fortress.  |
| <b>Glacis</b>                   | A broad, gently sloped earthwork built up outside the <b>covered way</b> . At the <b>covered way</b> it terminated against a <b>parapet</b> , and in the direction of the field it sloped downward until it generally blended into the natural level of the ground.   |
| <b>Gorge</b>                    | In a <b>bastion</b> , the interval or space between the two <b>curtain angles</b> .   |
| <b>Guardhouse</b>               | The headquarters for the daily guard; also a structure containing a guardroom for prisoners.  |
| <b>Interior Slope</b>           | The inner side of a <b>parapet</b> , generally connecting the <b>superior slope</b> with the <b>banquette</b> .   |
| <b>Magazine</b>                 | A place for the storage of gunpowder, arms, provisions, or goods.   |
| <b>Parade</b>                   | An area, usually centrally located, where troops were assembled for drill and inspection.   |
| <b>Parapet</b>                  | In <b>fortification</b> , a work of earth or masonry forming a protective wall, over which defenders fired their weapons.   |
| <b>Pentagonal</b>               | A bastioned work developed on a polygon of <b>fortification</b> in the form of a pentagon.  |
| <b>Rampart</b>                  | A mass of earth formed with material excavated from the <b>ditch</b> , or constructed of masonry and casemated, to protect the enclosed area from artillery fire and to elevate defenders to a commanding position overlooking the approaches to a <b>fort</b> or fortress.   |
| <b>Ravelin</b>                  | A work consisting of two faces forming a <b>salient</b> angle which was closed at the <b>gorge</b> . <b>Ravelins</b> were separated from the main <b>body of the place</b> by <b>ditches</b> and functioned to protect <b>curtains</b> .  |
| <b>Revetment</b>                | The facing of the sides of a <b>ditch</b> or <b>parapet</b> .   |

|                       |   |
|-----------------------|---|
| <b>Salient</b>        | An angular work which projects outward from the interior.   |
| <b>Sallyport</b>      | A passage, either open or covered, from the <b>covered way</b> to the country; or a passage under the <b>rampart</b> , usually vaulted, from the interior of a <b>fort</b> to the exterior, primarily to provide for sorties. |
| <b>Scarp</b>          | The interior side of the <b>ditch</b> . It was also sometimes termed escarp.  |
| <b>Superior Slope</b> | The top surface of an earth <b>parapet</b> , which slants downward toward the country, the slope of which is inclined sufficiently to allow defenders to cover all the ground outside the <b>ditch</b> .                      |
| <b>Terreplein</b>     | A level space on the <b>rampart</b> between the <b>parapet</b> and the <b>parade</b> .  |

16. **REFERENCES**

Boston Harbor Islands National Park Area–General Management Plan 2002 192pp.

Director's Order 12 - National Park Service. 91pp 2001

Georges Island Master Plan – de Castro / Nelson Associates, Metropolitan District Commission, 1988

Georges Island, Fence and Safety Study, Draft Historic Projects Database – Metropolitan District Commission, 1989

Omnibus Parks and Public Lands Management Act of 1996, Public Law 104-33, 110 Stat. 4093, Section 1029.

Management Policies 2001. National Park Service. 137 pp.

Massachusetts Coastal Zone Management Plan, 2002 – Massachusetts Office of Coastal Zone Management